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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/980,752	04/05/2002	Kimihiko Imamura	70551/56711	7570

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EXAMINER

WONG, LINDA

ART UNIT	PAPER NUMBER
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2611

DATE MAILED: 03/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/980,752

Applicant(s)

IMAMURA ET AL.

Examiner

Linda Wong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-15, 17, 18 and 21-23 is/are allowed.
- 6) ☒ Claim(s) 1, 3-5, 7, 8, 19 and 20 is/are rejected.
- 7) ☒ Claim(s) 2, 6 and 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 12/27/2005 have been fully considered but they are not persuasive. The applicant argues the prior art references, Moose et al and Junell et al, fail to teach "a first memory adapted to store N (N is an integer of 2 or more) types of reference signals, each corresponding to an arbitrary portion in said start symbol". The applicant also argues that Junell teaches disclose "a memory first storing N types of reference signals (i.e., a so-called "format"), the reference signals so stored as far as Applicants have been determined are not limited to "arbitrary portions of said start signal" as herein claimed. Rather, the so-called "format" of the Junell et al reference appears to include samples from the beginning, end and middle of the received signal." Based on the applicant's arguments and Junell et al's specification, the memory unit disclosed by Junell et al stores the reference signal at any or either portions in the start symbol. Junell et al discloses the receiver has prior knowledge of the format of the received signal. (Col. 4, lines 2-5) The A/D converter takes samples at regular intervals of the entire received signal. This indicates that the memory storage will store samples from all arbitrary portions of the signal, which includes all arbitrary portions of the start symbol. Although Junell et al teaches a memory storage that stores more than the recited limitation, Junell et al's memory storage still functions to store the reference signals corresponding to an arbitrary portion of in the start symbol. Thus, the examiner disagrees that Junell et al fails to teach a "memory storage adapted to store N types

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of reference signals, each corresponding to an arbitrary portion in said start symbol". Thus, the rejection to claim 1 stands as stated in the office action mailed 9/2/2005.

Claim Objections

2. Claims 16 is objected to because of the following informalities:
 - a. Claim 16, lines 6 and 7, and Claim 23, line 7, recite the limitation "C/N". The variables "C" is not defined within the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1,19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Moose et al (US Patent No.: 6459745) in view of Junell et al (US Patent No.: 6125124).
 - a. **Claim 1**, Moose et al discloses an orthogonal frequency division multiplexor (OFDM) frequency/timing recovery circuit comprising using N number of samples and elaying each sample to produce N number of reference signals

(Col. 3, lines 51-55, Col. 5, lines 34-46 and Fig. 6A, labels 602 and 604), wherein the samples are used for cross correlation (Col. 6, lines 20-25 and Fig. 6A, label 606), peak detection means (Fig. 6A, labels 608 and 610), and correcting the frequency error based on the frequency offset estimated (Fig. 6B, label 624)/ Although Moose et al does not teach a first memory means for storing N types of reference signals, Junell et al discloses a frequency OFDM transmission system comprising a memory block for holding sample sequences of a known format and cross correlating the samples with the received signal (Col. 4, lines 18-29). It would be obvious to one skilled in the art to use a memory block to store samples or types of reference signals to accommodate the multiple samples needed to allow the receiver to find an efficient correlation between the samples and received signals.

- b. **Claim 19** inherits all the limitations of claim 1.
- 4. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Moose et al (US Patent No.: 6459745) in view of Junell et al (US Patent No.: 6125124) and further in view of Tsuruoka (US Patent No.: 6549589).
 - c. **Claim 3**, Although Moose et al and Junell et al fail to teach a frequency offset compensation means by rotating the phase of a subcarrier of the reception signal based on the frequency offset estimate, Tsuruoka discloses a receiver with a frequency compensation unit wherein the estimated frequency offset or error is used to correct the carrier. (Col. 2, lines 54-60 and lines 62-67)

5. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Moose et al (US Patent No.: 6459745) in view of Junell et al (US Patent No.: 6125124), and further in view of Nomura et al (US Patent No.: 6275551).

d. **Claim 4**, Although Moose et al and Junell et al fail to teach a variable local oscillator, Nomura et al discloses an OFDM receiver comprising a detection means (Fig. 2, labels 11, 12 and frequency synchronizing controller) comprising a local oscillator controlled by a frequency offset detection or estimation. (Col. 8, lines 16-34) It would be obvious to one skilled in the art to incorporate a variable oscillator with the local oscillator to Moose et al and Junell et al's invention to reduce frequency offset. (Col. 8, lines 16-34)

6. **Claims 5,20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Moose et al (US Patent No.: 6459745) in view of Junell et al (US Patent No.: 6125124), further in view of Tanaka (US Patent No.: 6498822).

e. **Claim 5** inherits all the limitations of claim 1, but claim 1 does not recite a frequency compensation unit comprising averaging the frequency offset estimates. Although Moose et al, Junell et al does not disclose averaging the frequency offset estimates, Tanaka discloses a prior reference wherein a frequency error detection circuit comprising correlation using match filter, determining the peak timings of the symbols and computing the average of the peaks. (Col. 1, lines 45-67 and Col. 2, lines 1-21) It would be obvious to one

skilled in the art to incorporate averaging the peak to quickly detect frequency and symbol timings with a receiving radio signal when a low carrier to noise ratio exists. (Col. 1, lines 10-17)

- f. **Claim 20** inherits all the limitations of claim 5.
- 7. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Moose et al (US Patent No.: 6459745) in view of Junell et al (US Patent No.: 6125124), further in view of Tanaka (US Patent No.: 6498822) and further in view of Tsuruoka (US Patent No.: 6549589).
- g. **Claim 7** inherits all the limitations of claim 3.
- 8. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Moose et al (US Patent No.: 6459745) in view of Junell et al (US Patent No.: 6125124), further in view of Tanaka (US Patent No.: 6498822), and further in view of Nomura et al (US Patent No.: 6275551).
- h. **Claim 8** inherits all the limitations of claim 4.

Allowable Subject Matter

- 9. **Claims 2, 6** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
- 10. **Claims 9-11, 12-15, 16-18, 21-23** are allowed over prior art.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Linda Wong whose telephone number is 571-272-6044. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Linda Wong

A handwritten signature in black ink, appearing to read 'Linda Wong', with a horizontal line extending from the end of the signature.

DAC HA
PRIMARY EXAMINER